

ABSTRACT OF THE DISCLOSURE

A probe having a pair of closely spaced electrodes is immersed in the lubricant and one electrode is excited with a relatively low voltage AC current. The frequency is swept over a range of about 1 – 10,000 Hertz and the current and phase angle measured at selected frequency intervals. The reactive (Z'') and resistive (Z') impedances are computed for each current measurement and values of Z'' plotted as a function of Z' as a Nyquist plot. The center of curvature of the plot between the origin and the minimum value of Z'' is located; and, the angle of depression of a line from the origin through the center of curvature Θ is determined from the plot. Samples of lubricant having known concentration of soot are measured and the angle Θ determined for each sample. The angle is then plotted as a function of soot concentration and a smooth curve fitted to the data plots. The curve may be programmed into a microcomputer to be used with the sensor for real time determination of soot concentration.